

# **A&B and.... ....declining ground water levels**



HDR/HyQual  
August 2004

A&B's position .....  
....has not changed

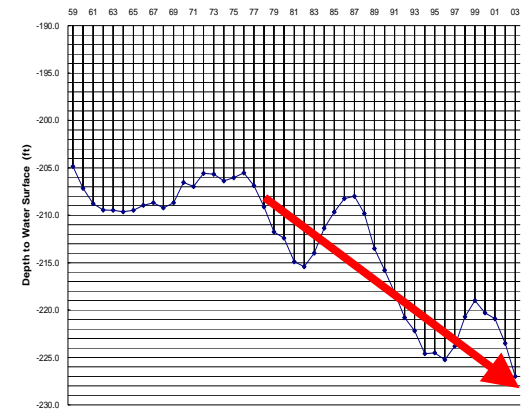
Data indicate **current pumping rates** are  
**not sustainable ?**

To fix this declining aquifer

**curtailment** of pumping

should be

the **primary solution!**



# A Preview.....

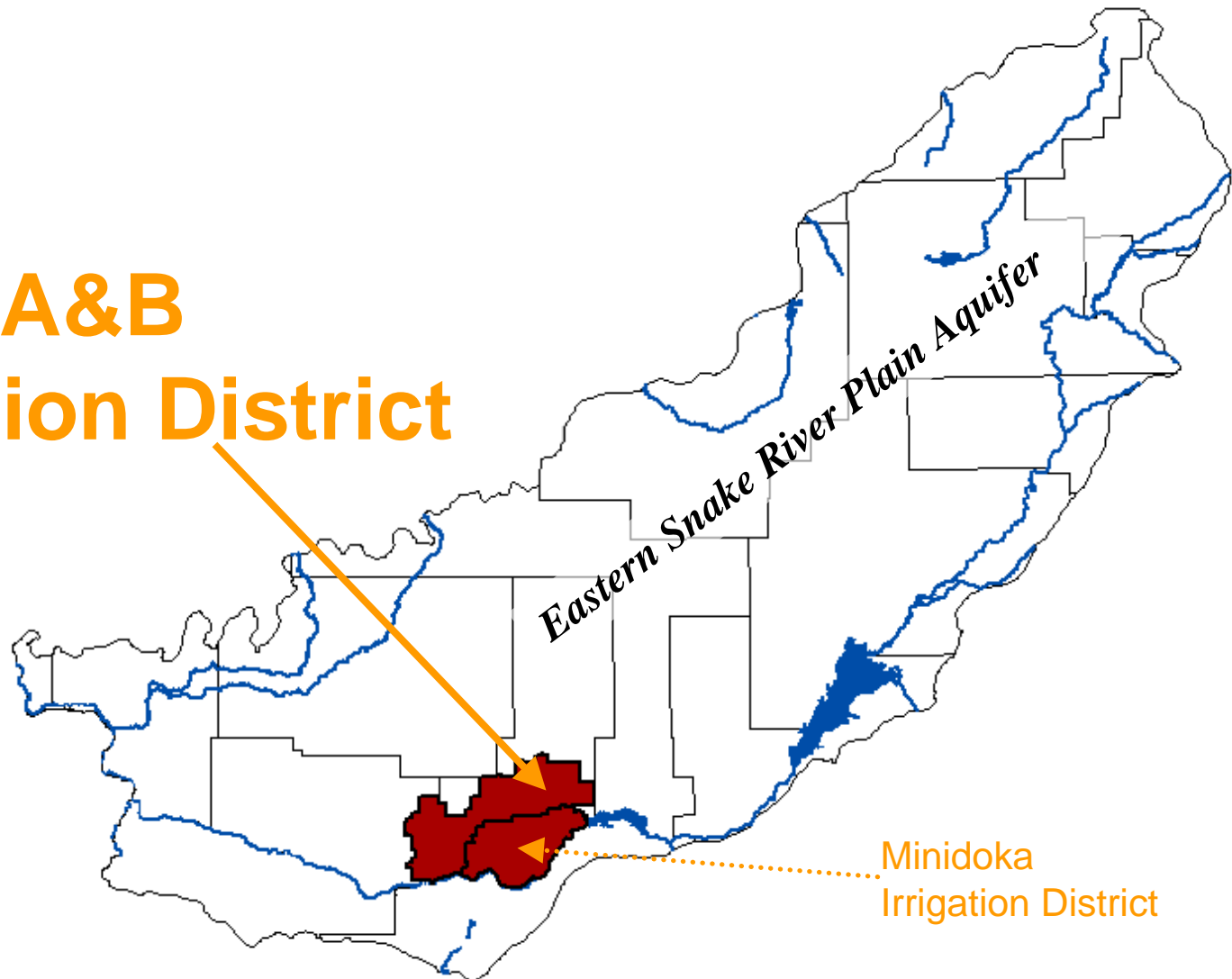
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- Introduction -
  - ✓ Bottom line
  - Preview
- Part 1- Unit B of A&B Irrigation District
  - Background
  - Declining water levels
  - Increasing costs
- Part 2 - IDWR Regulatory/technical Approach
  - ESPA Model
  - Water Budget
  - Model Scenarios
- Closing Comments
  - A&B Actions and Positions

Part 1

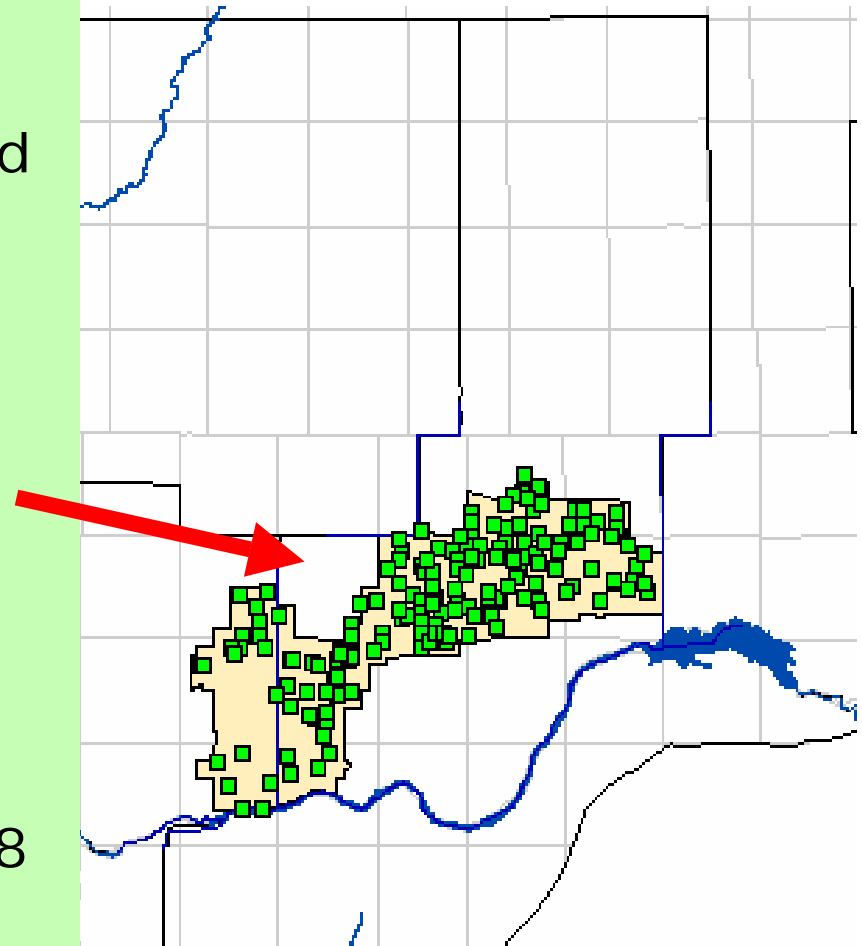
# Unit B of A&B Irrigation District

**A&B  
Irrigation District**



# Unit B of A&B

- 300 water users
  - ~66,000 acres
  - Served by GW and wastewater
- 174 wells
  - Down from 177
- Water Right:
  - 1100 cfs
  - Priority date –
  - Sept 9, 1948



# Decline of “low” pumping level at A&B Irrigation District

A&B, 2003

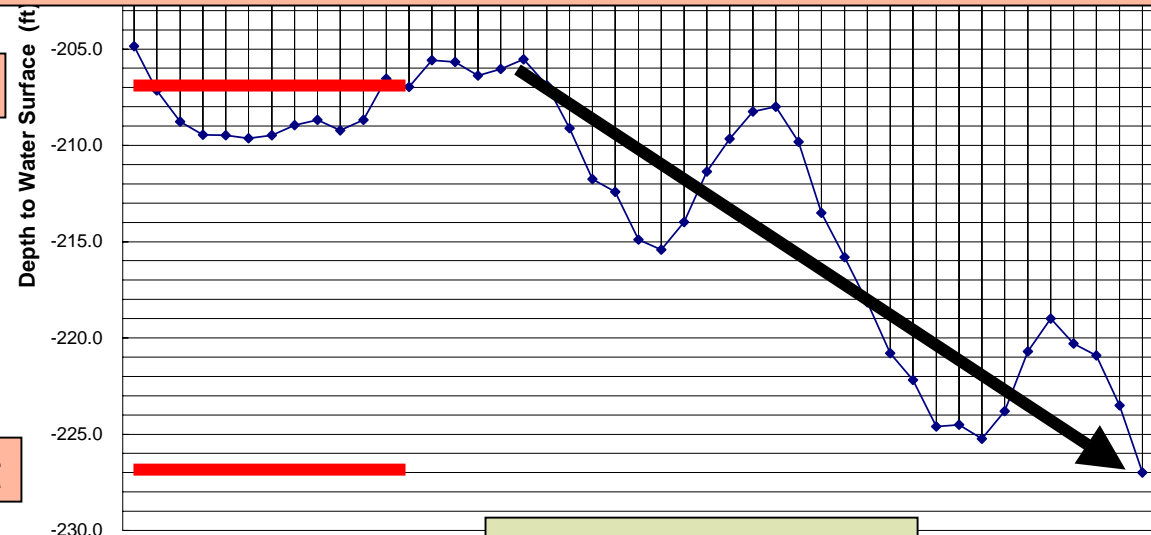
Mid 70s

Data shows aquifer levels

**declined..... ~ 20 feet**

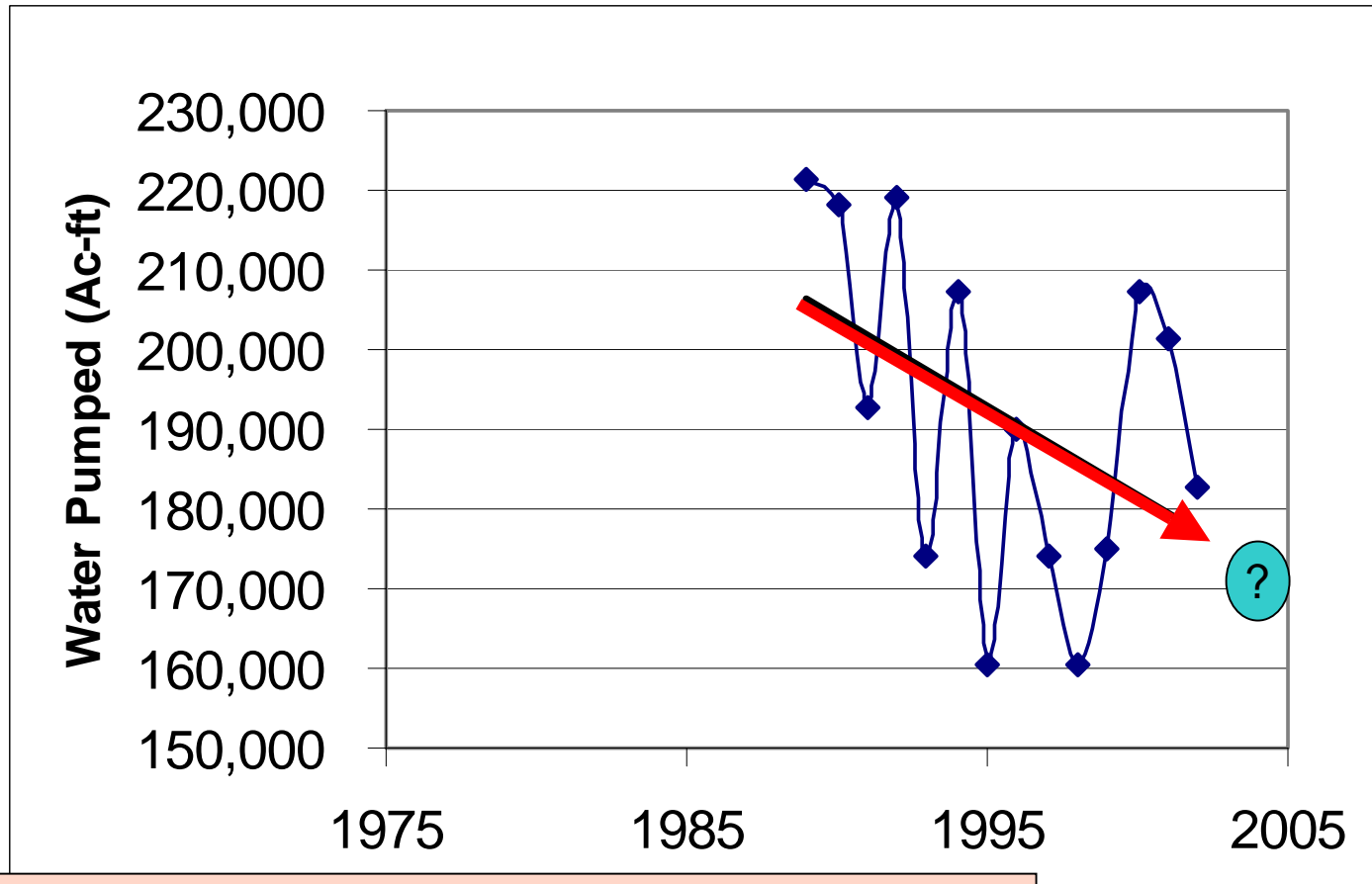
-207 ft

-227 ft



A&B, 2003

# Groundwater volume delivered ... .....has dropped over 12 %



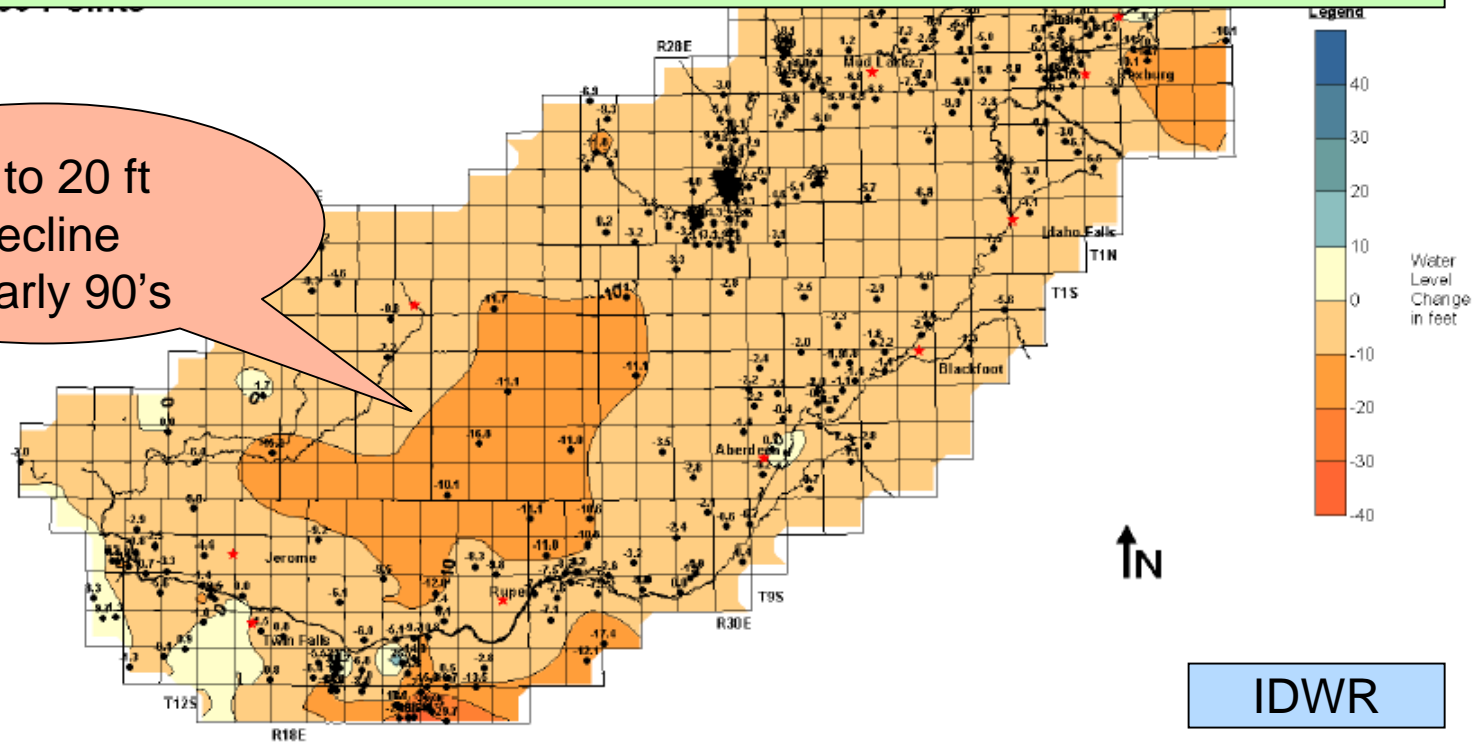
Peak pumping capacity also dropped  
~ 12% (961 vs 1100 cfs)

A&B, 2003

# Groundwater withdrawal in Upper Snake .... increased substantially during late 80's

USGS water supply reports

10 to 20 ft  
decline  
in early 90's



DWR49956p\common/esrp/surfer/chan/SP90-95.srf SS

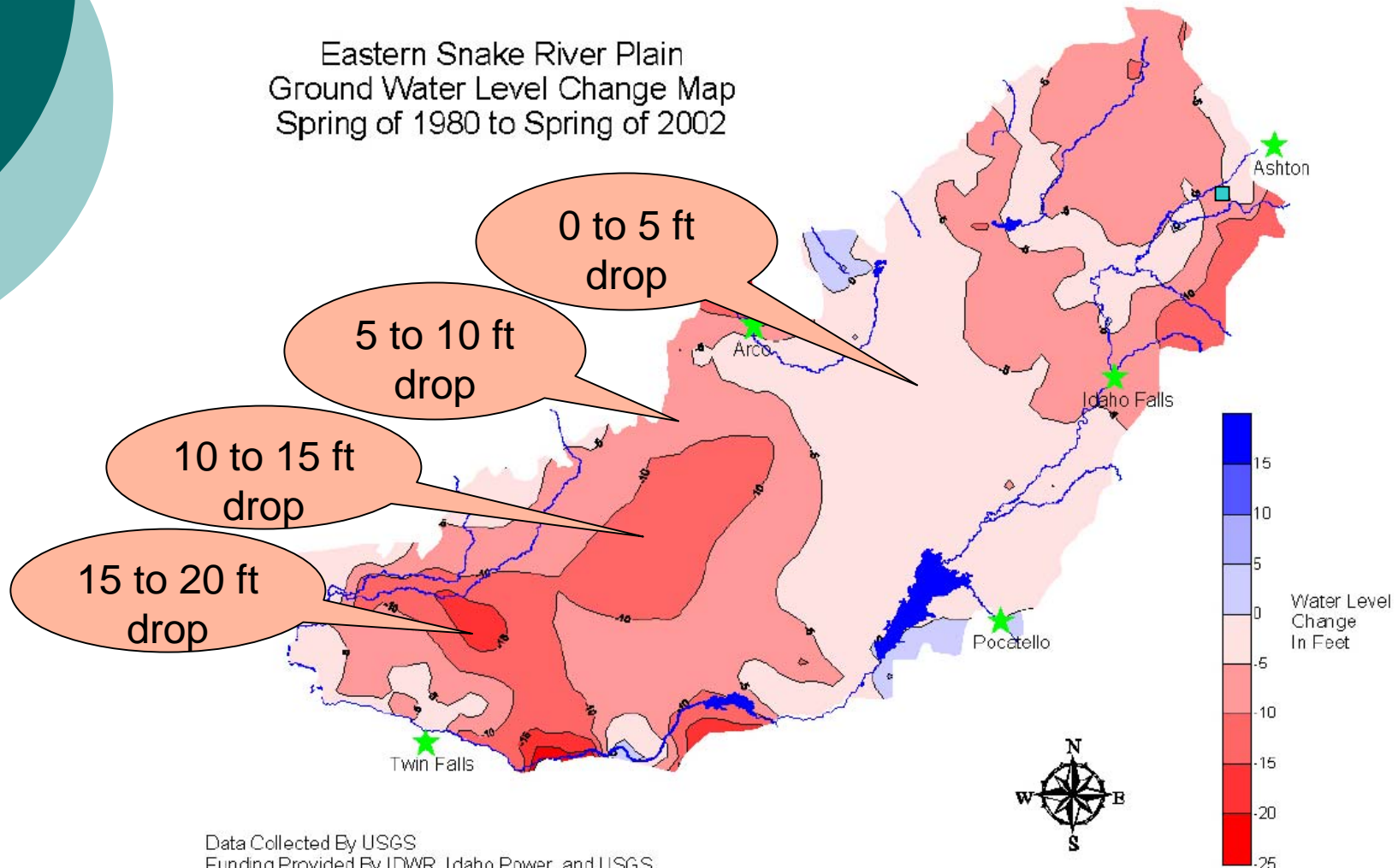
Increased GW pumping contributes to  
.....decline of water levels

# Decline of water levels

.... occur across **ESPA**

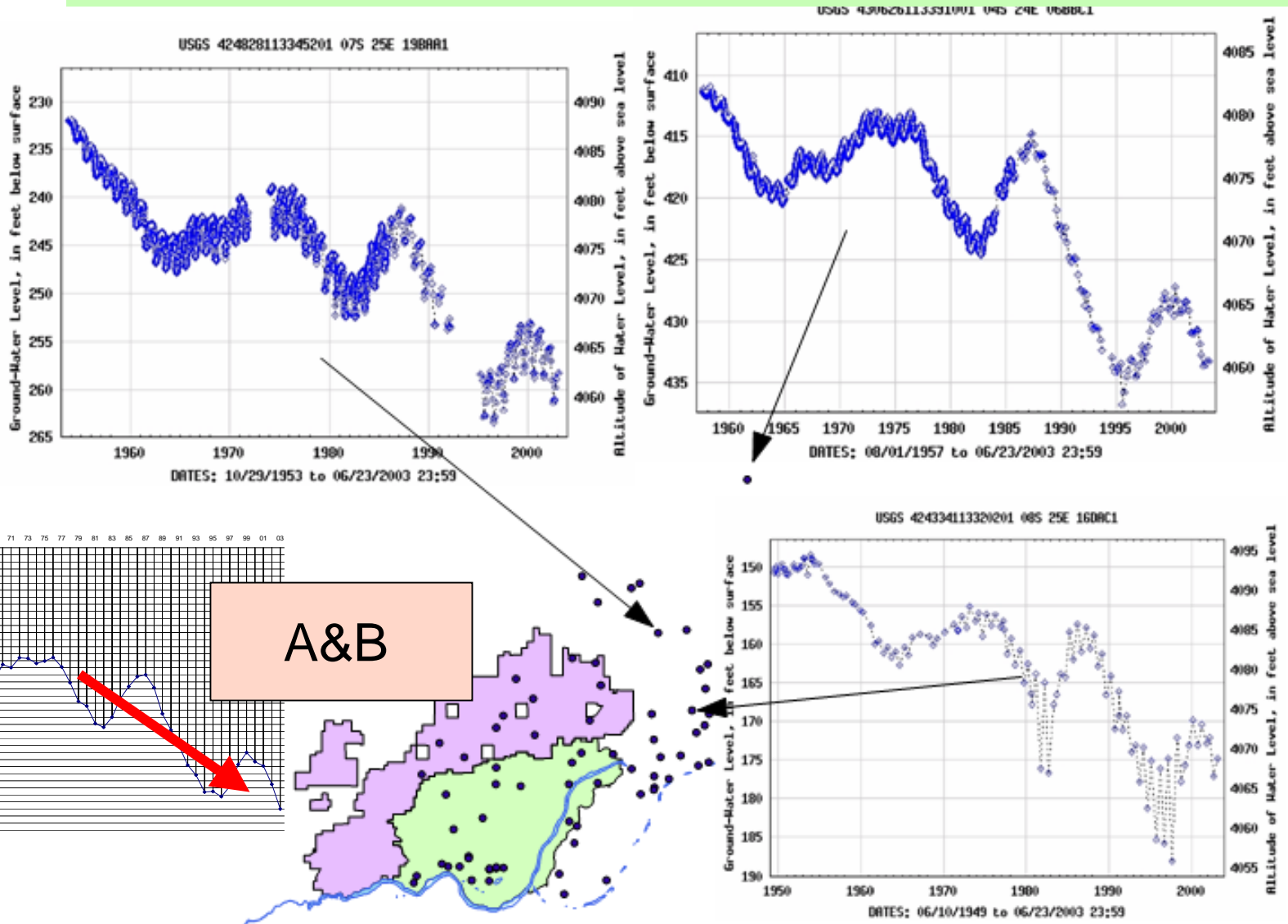
IWRRI


Eastern Snake River Plain  
Ground Water Level Change Map  
Spring of 1980 to Spring of 2002



Data Collected By USGS  
Funding Provided By IDWR, Idaho Power, and USGS  
Maps Prepared By University of Idaho IWRRI

# Declining ground water levels to north and east follow similar trends.....





Water level declines .....

**...increase costs for A&B Water Users**

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Costs have increased -

~ Annual:

- |                                |            |
|--------------------------------|------------|
| ✓ Drilling and deepening wells | ≈ \$41,000 |
| ✓ Abandon and replace wells    | ≈ \$80,000 |
| ✓ Lower pumping efficiency     | ≈ \$38,000 |
| ✓ Higher pumping costs         | ≈ \$16,000 |

Average annual (91-94)

≈ \$174,000

Last winter A&B spent **\$280,000**

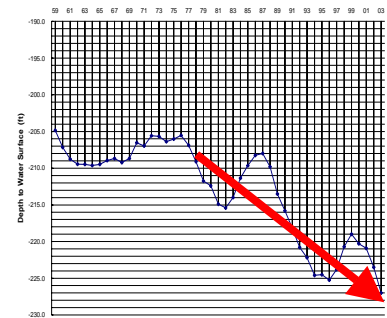
**.....chasing declining water levels**

...over \$640 per Water User

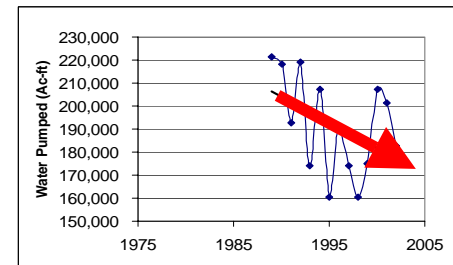
# Data show

..... ~30-year decline

➡ Groundwater has declined  
by 20 ft, or more



➡ Capacity has decreased  
over 12%



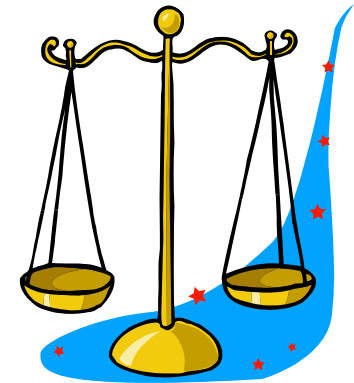
➡ Costs continue to increase

over \$640 per Water User in 03-04

## Part 2 –

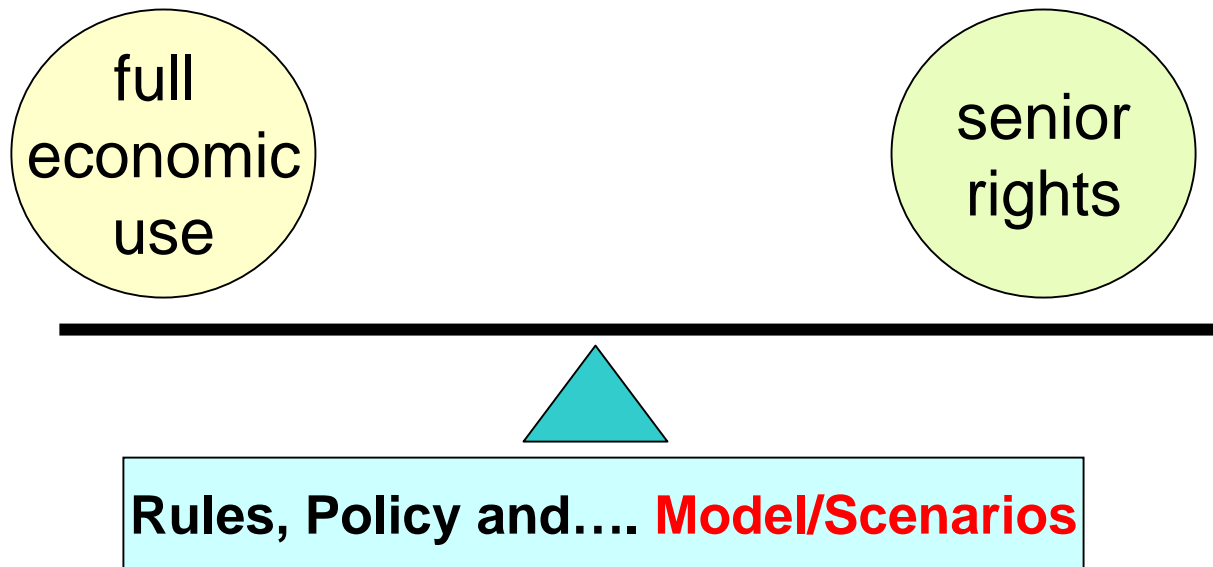
# IDWR's ..... Approach

- Regulatory approach
- Technical approach
  - ESPA Model revision
  - Preliminary Scenarios
- Model uncertainty and questions



# Regulatory approach –

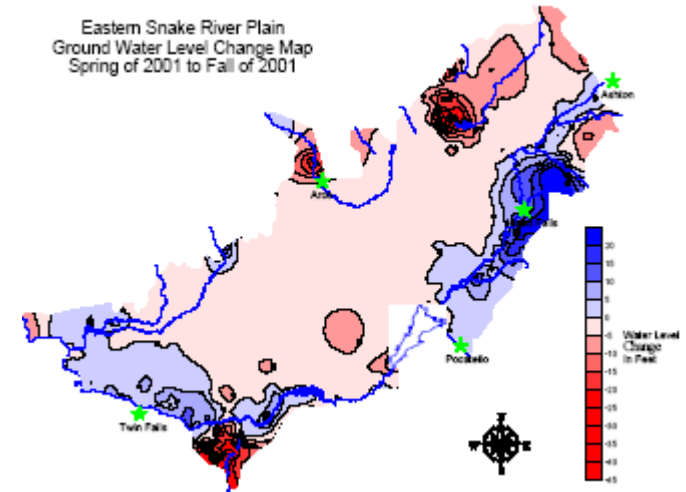
IDWR determines injury  
..... by balancing



# ESPA Model .....Status

## Revise Aquifer Model (ESPA)

- **Not new, but revised...**
  - ✓ Grid, BC's, forcing functions
- Calibration
  - ✓ Preliminary calibration  
**Spring 2004**
  - ✓ Final calibration  
**Now available?**
- Documentation
  - On hold to run scenarios
- Model Scenarios
  - **in-process**



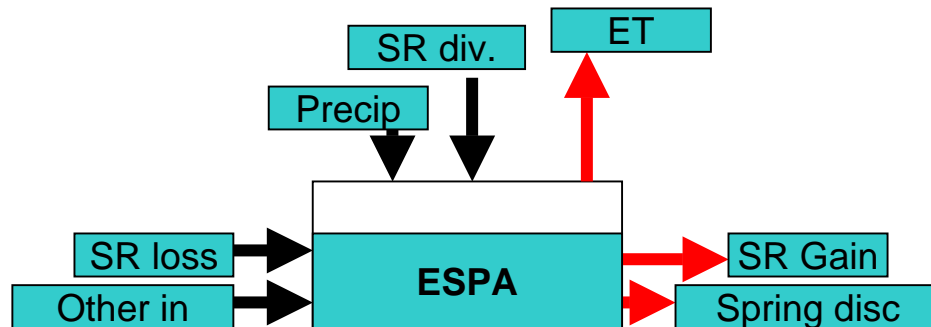
# Preliminary Scenario Results

IWRRI July 2004

Preliminary Conclusion:

Aquifer is near equilibrium

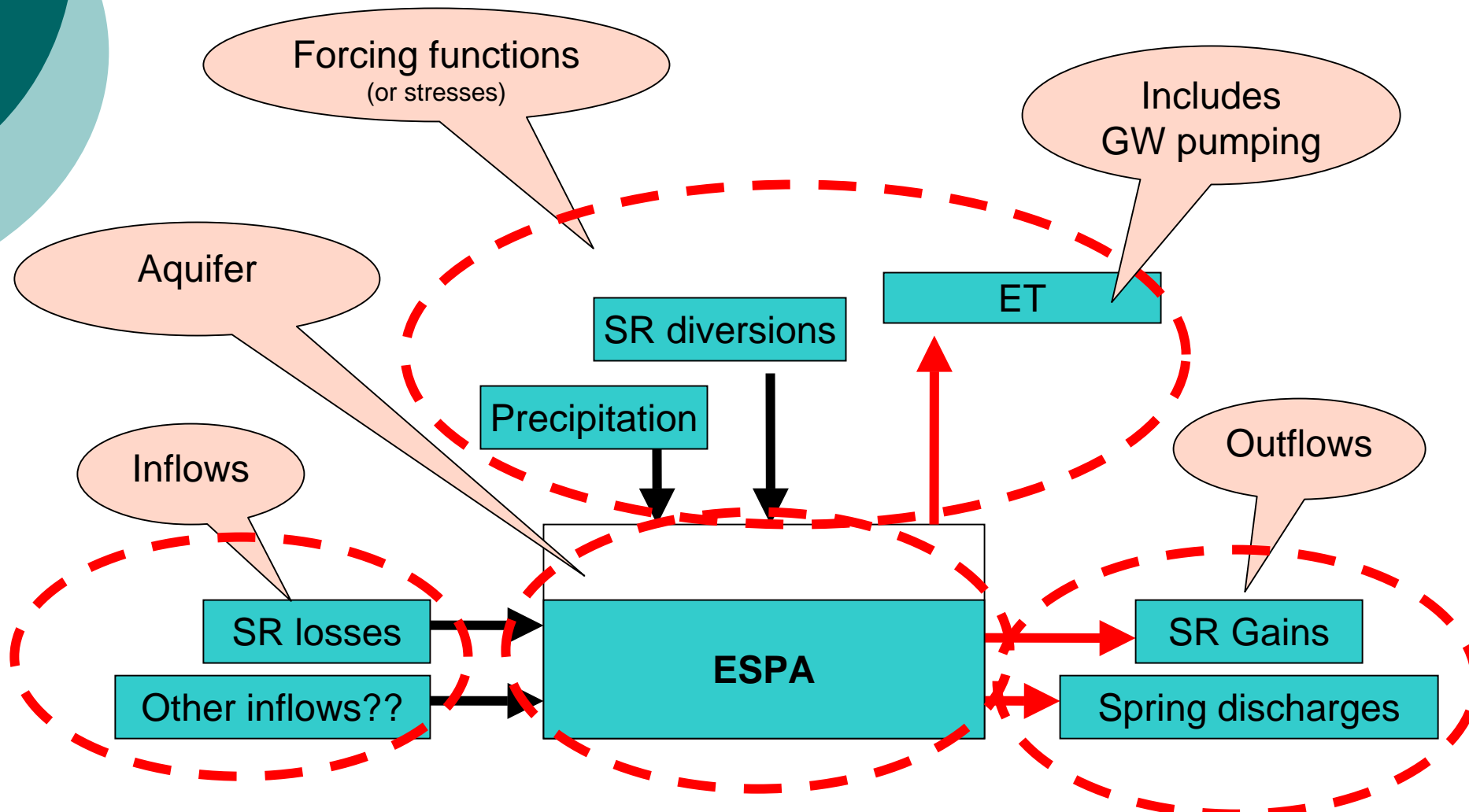
IWRRI 2004



However, data do not appear  
...to support this conclusion

...and there is high degree of uncertainty  
with this partially documented model

# A "Simplified" Ground water model



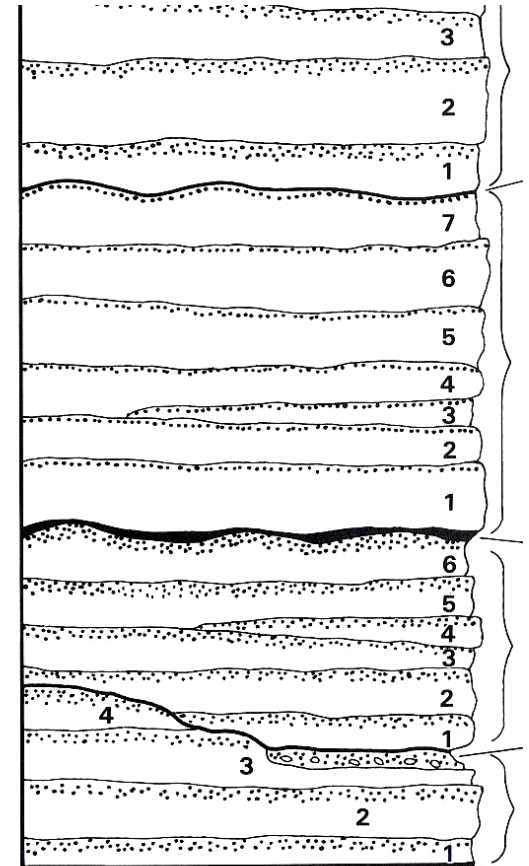
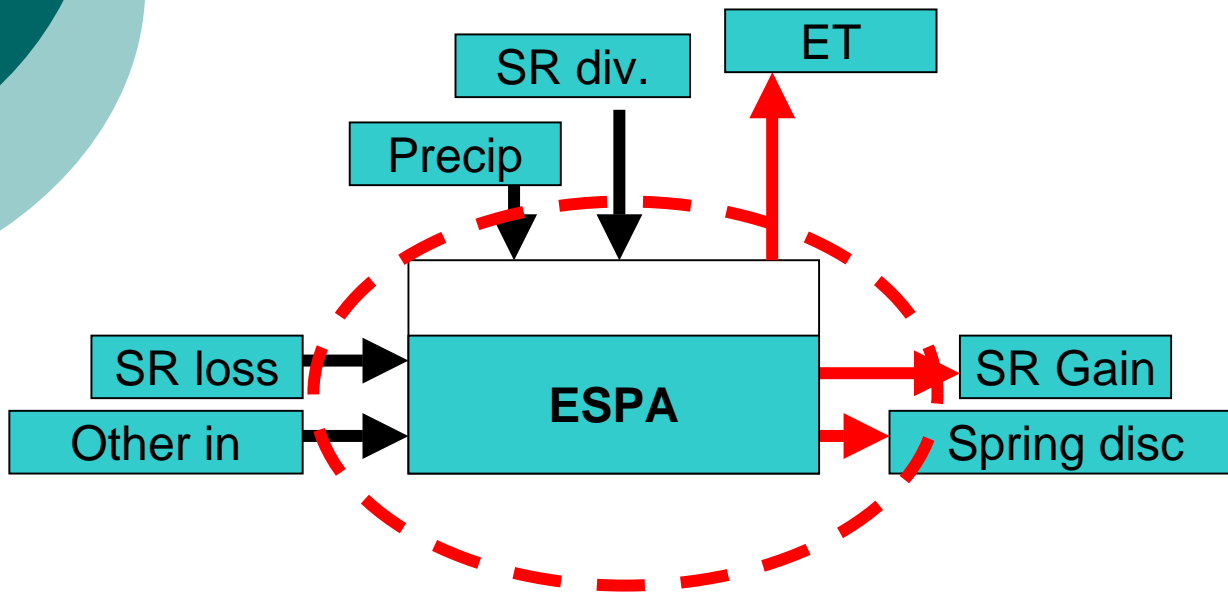
# Complex models have high ..... Uncertainty

## Types of model uncertainty

- 1. Model structure
- 2. Model parameter values
- 3. Observed data
- 4. Model forcing functions
- 5. Model output

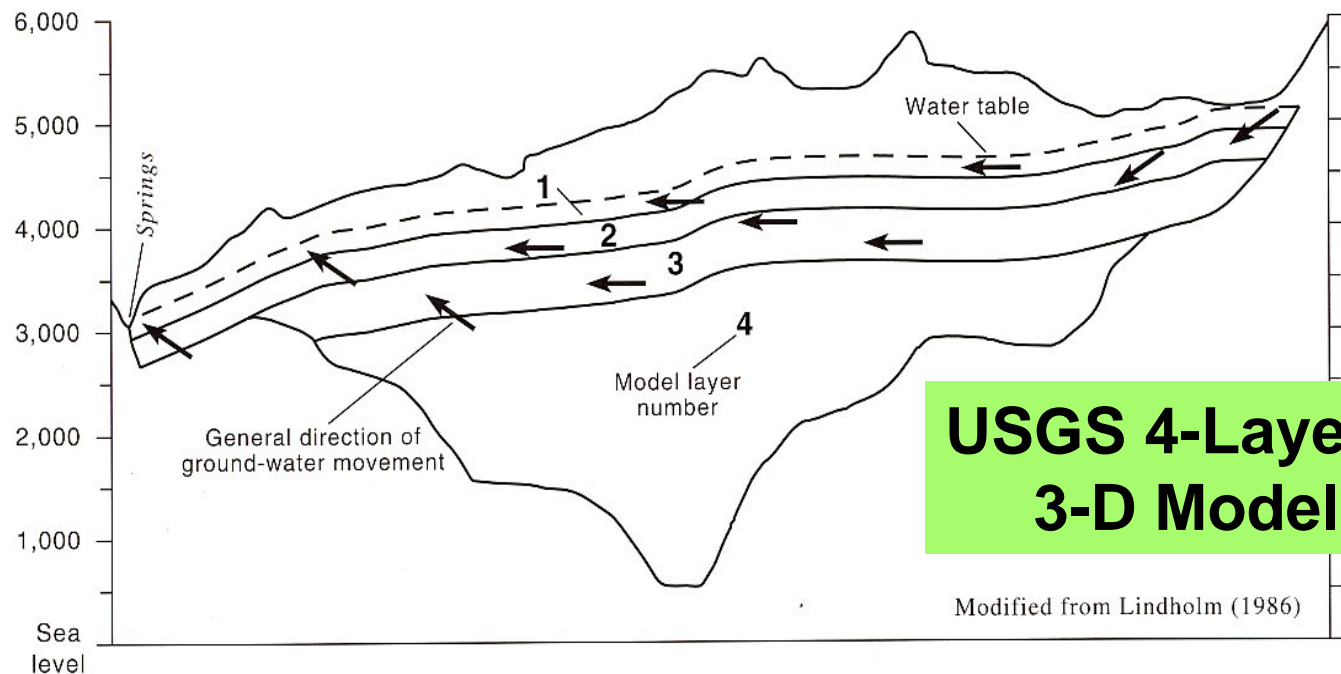
(Brown 2003)

# Uncertainty regarding .... ...model structure



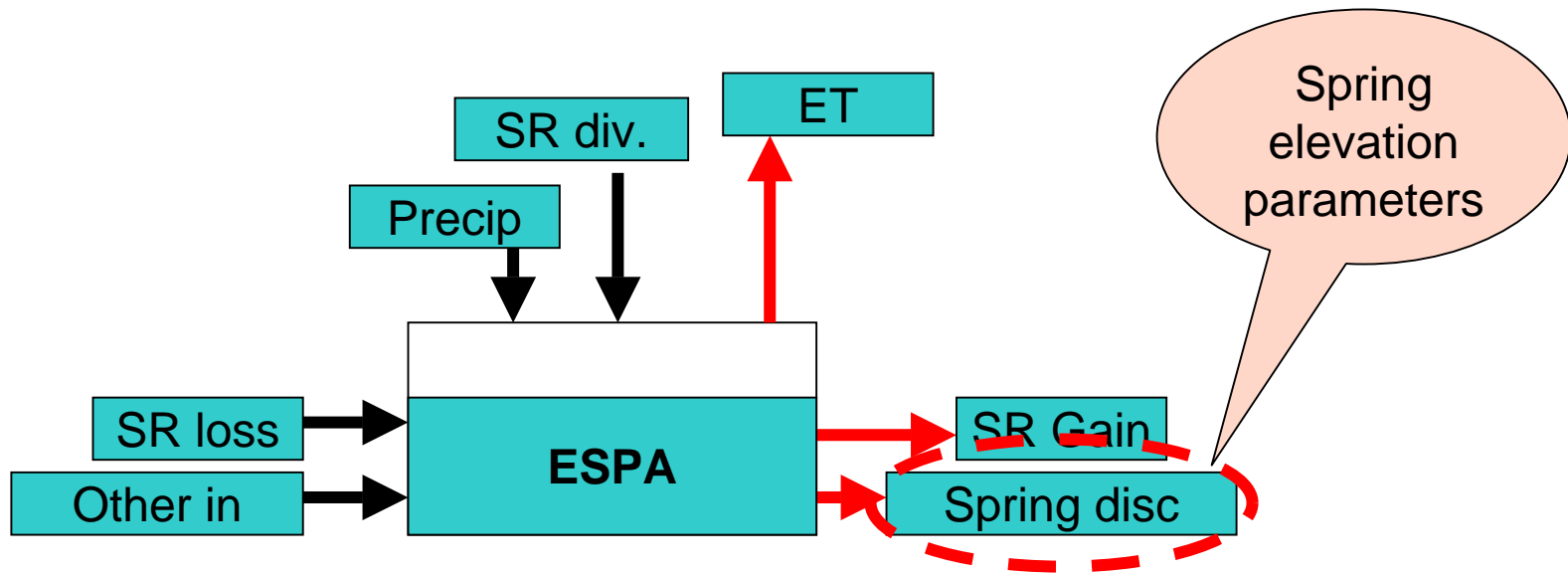
Note: In this study, each individually cooled unit is referred to as a flow

# Uncertainty regarding .... ...model structure



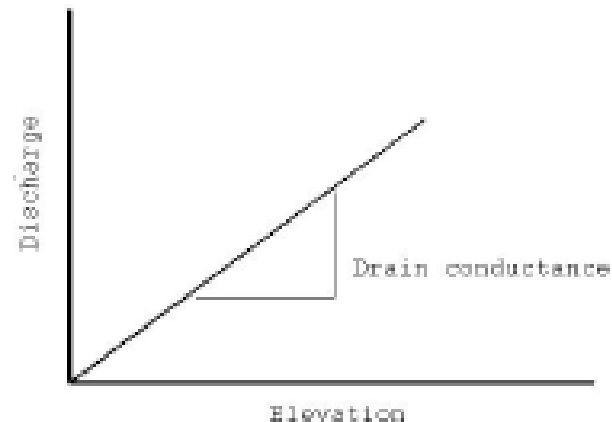
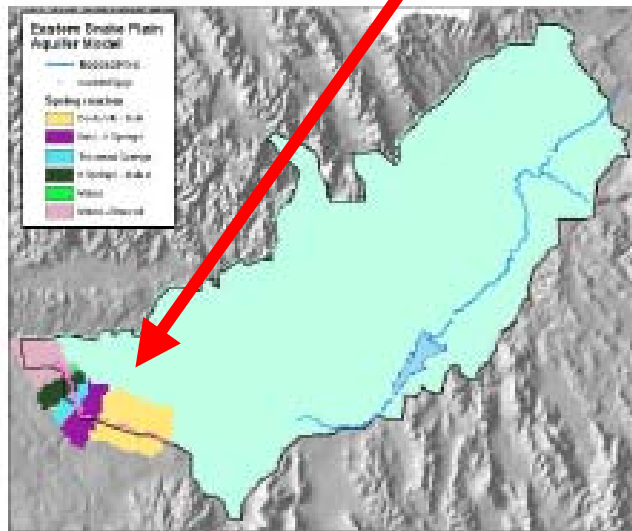
**Question: Why is 3,000+ feet of basalt aquifer  
now represented as a .....1-layer, 2-D model?**

# Uncertainty regarding .... ...parameters



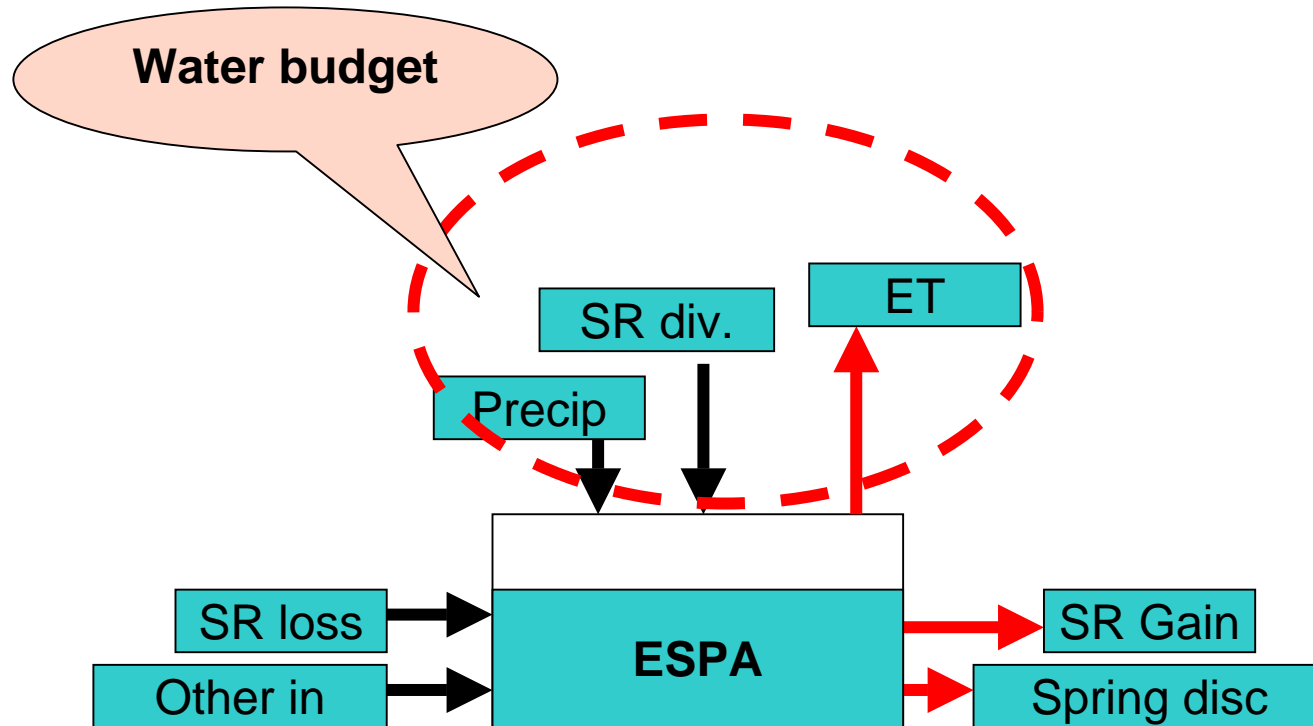
# Uncertainty regarding .... ...parameters

6 spring reaches modeled with 45 drain cells



Question: What is basis for adjusting spring elevations?

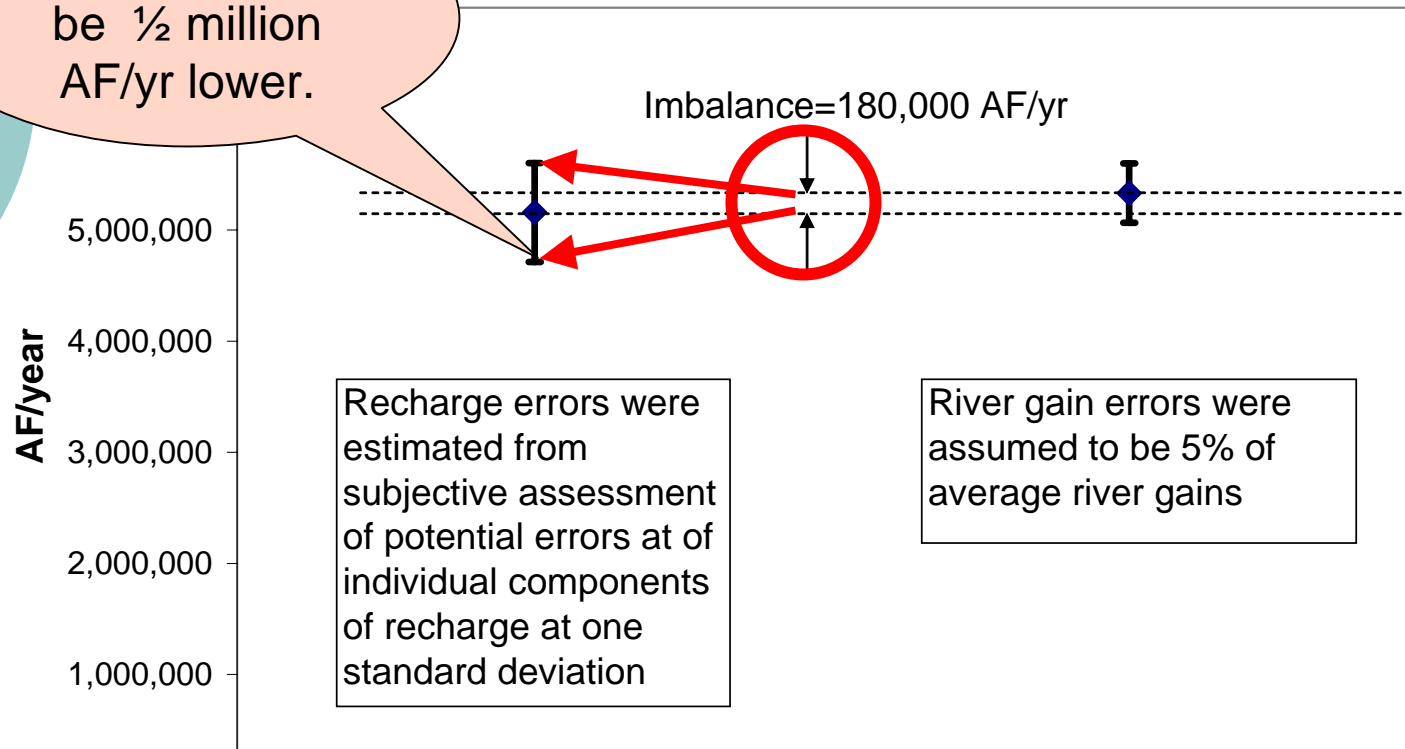
# Uncertainty of.... ...forcing functions (stresses)



# Water Budget uncertainty

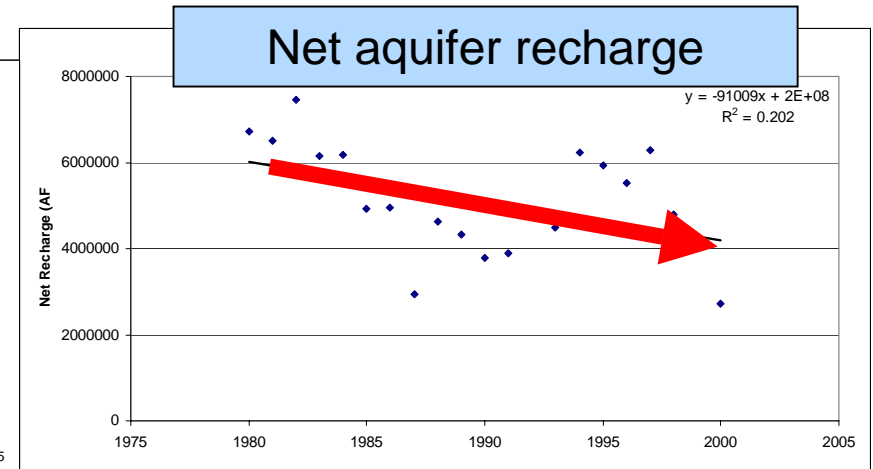
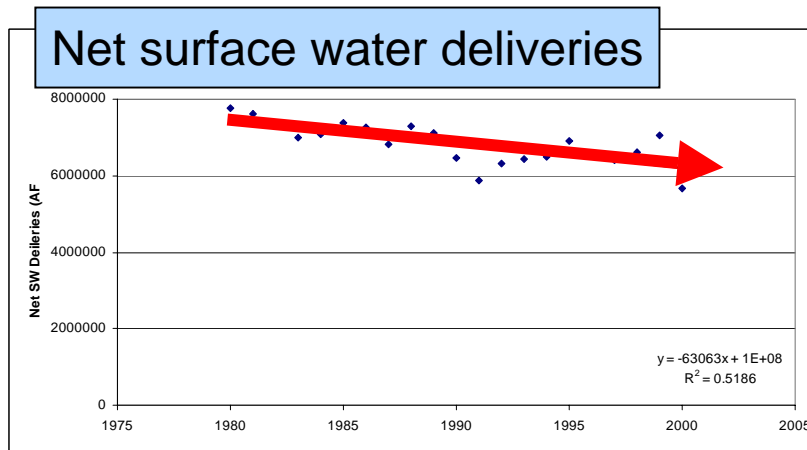
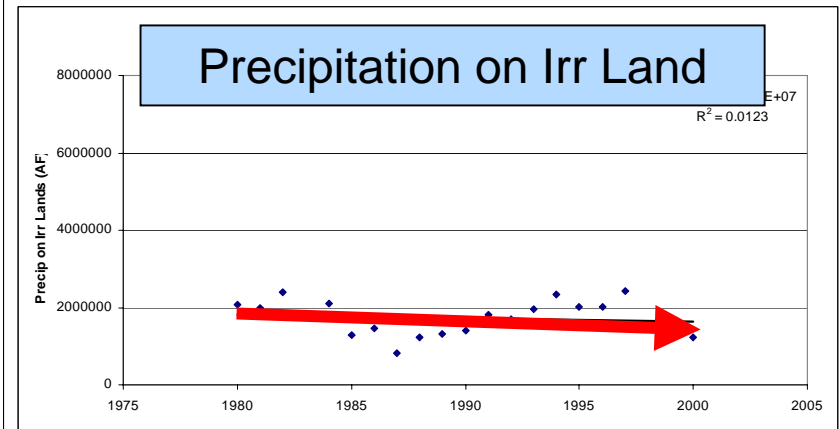
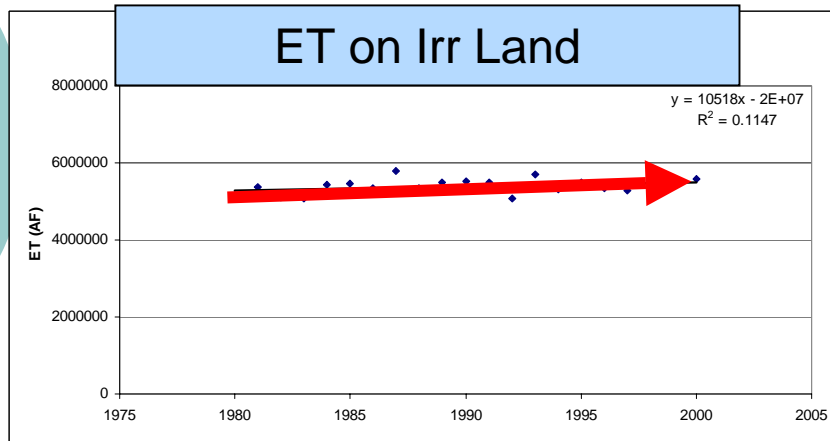
...IWRRI 2004

Recharge could be ½ million AF/yr lower.



**Questions: Does the water budget  
.....provide reliable answers?**

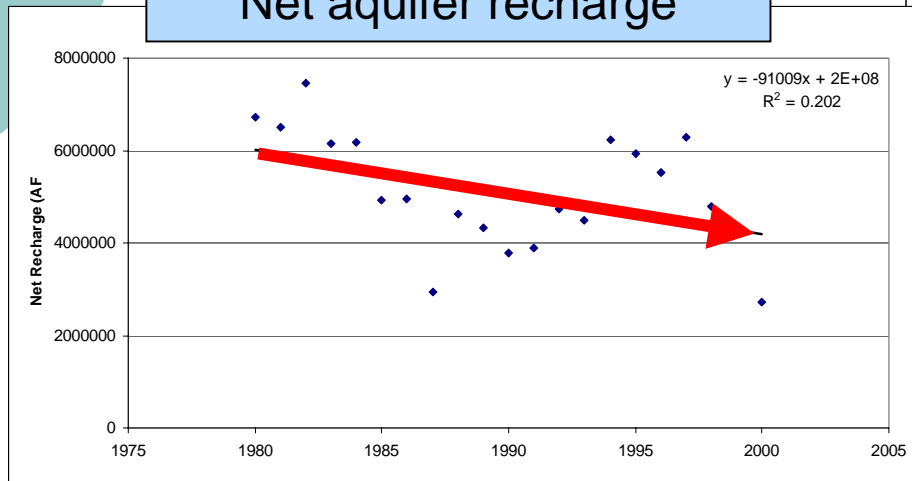
# Water budget is based on 22-year period (1980-2001)



# Data limitations ...force a shortened model period

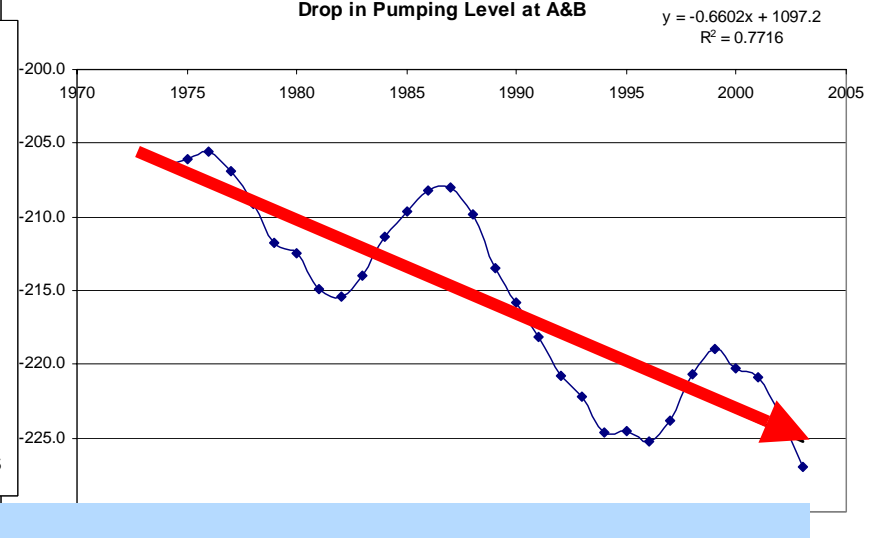
22 years

Net aquifer recharge




29 years

Drop in Pumping Level at A&B



Question:

Does model's 22-years decline represent...  
.....the aquifers 29-year decline?



Closing

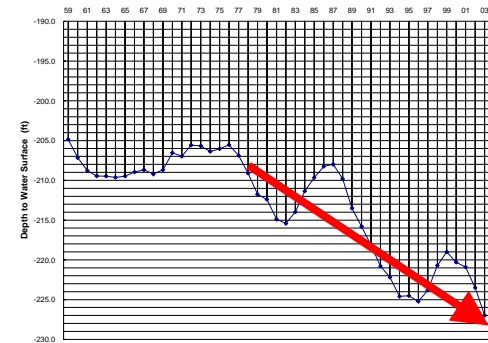
## A&B's Actions and Positions

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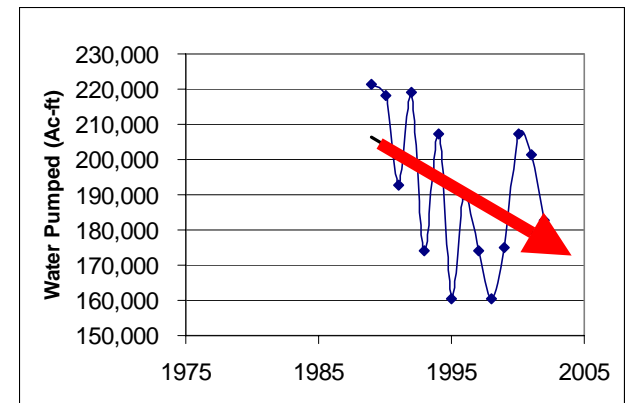
- Deepening wells....
- Track IDWR
- Tracking others
- Bottom line

# Declining water levels have resulted in .....decreasing groundwater capacity

- Average pumping levels are dropping
  - ✓ About 20 feet since 1970s

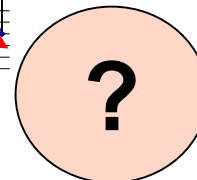
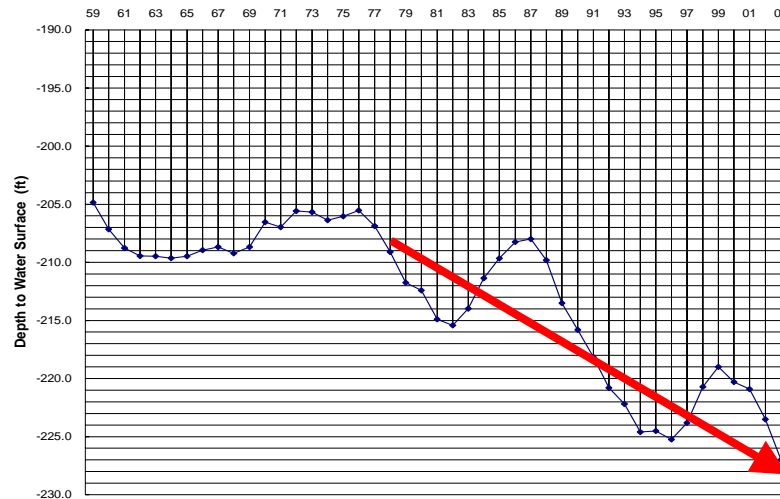


- Production capacity is decreasing
  - ✓ 12% decrease



# A&B Actions

- Deepen wells, but.....
  - pumping costs increase
  - less water is delivered
  - Not sure how more that can be done!





# A&B Position/Actions

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- Assess actions of IDWR
  - Is the model ready?
  - Do results represent actual conditions?
  - Do results make sense?

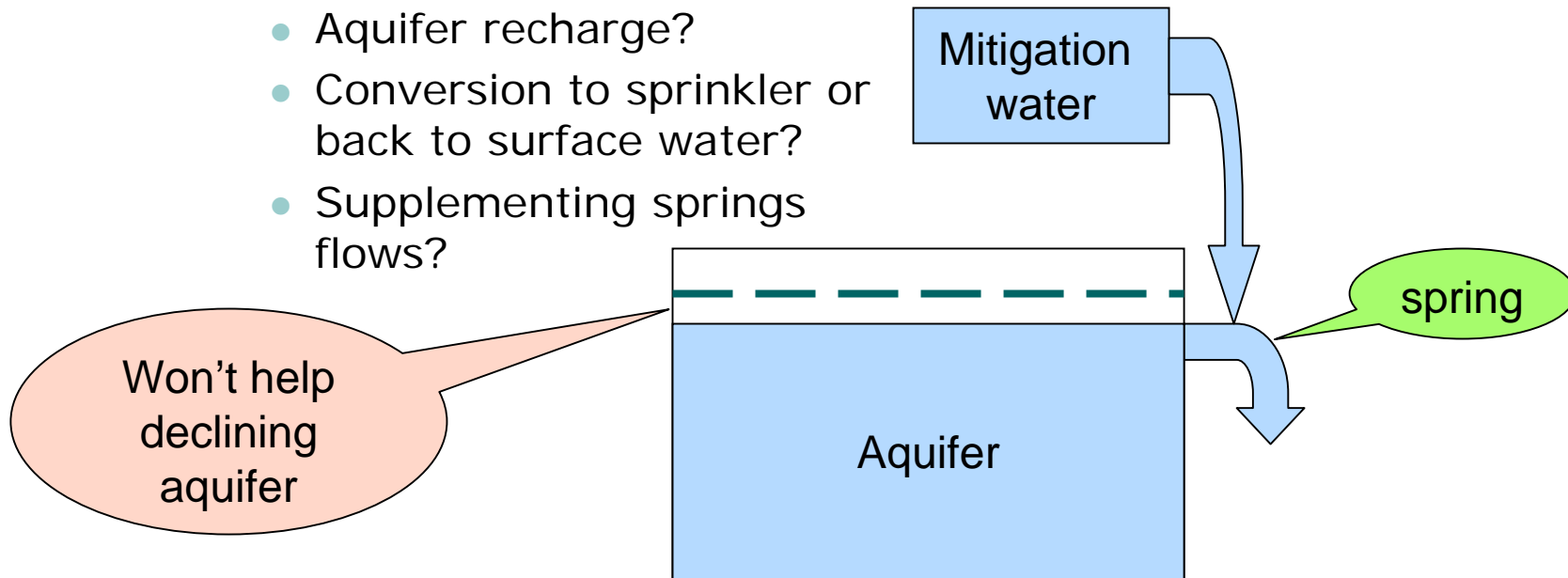
## Documentation is needed

- ASTM Standards on Hydrologic Assessment and Modeling (1996)
  - Establishes standard of practice
  - Supported by USGS, USEPA, and USDOE

# A&B Position/Actions

Assess actions by others:

- Aquifer recharge?
- Conversion to sprinkler or back to surface water?
- Supplementing springs flows?



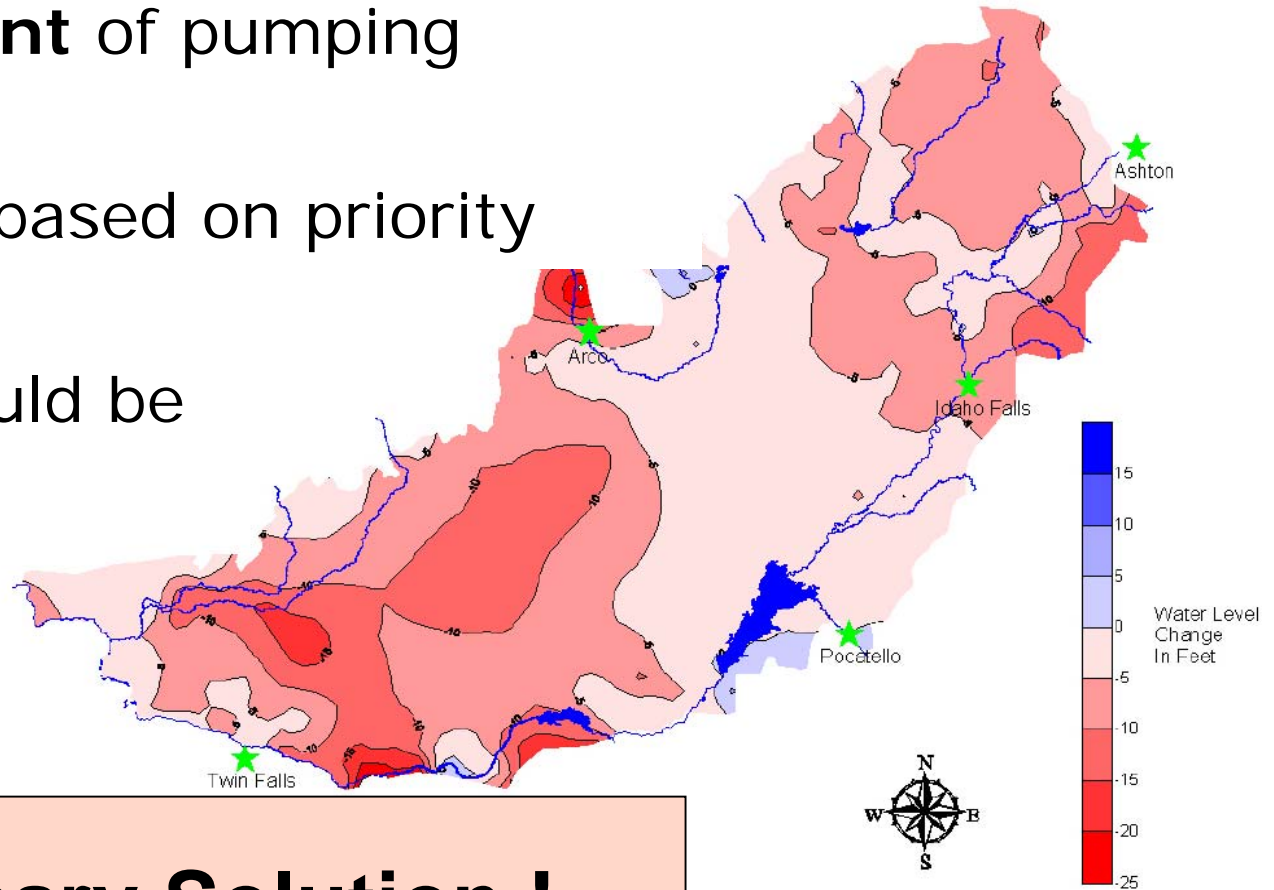
Solutions must **address**  
**aquifer declines**

Bottom line.....  
to fix this **declining aquifer**.....

**Curtailment** of pumping

based on priority

should be



**The Primary Solution !**



# The End

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Questions??

or

Comments!!